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FAA AVIATION NEWS

SEPTEMBER 1971

COVER
The aerial circus of Baron Von *Who?*
See page 4.

FAA AVIATION NEWS

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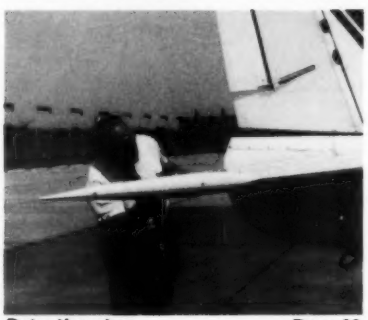

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John A. Volpe, *Secretary of Transportation*

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How Soon Can You See?

VFR visibility and cloud clearance minimums below 10,000 feet under scrutiny

Basic VFR weather minimums are under review by FAA's Air Traffic Service. The agency is now seeking opinions on the usefulness of certain proposed changes which would affect VFR minimums in both controlled and uncontrolled airspace.

Changing the measurement for reporting visibility from statute to nautical miles is also under consideration.

Over the 30-year span during which VFR minimums have, with few exceptions, remained constant (below 10,000 feet), airspeeds have doubled and trebled and weather has continued to play a major role in aircraft accidents, with inadvertent penetrations of IFR conditions a common tragic error.

The need for increasing VFR minimums in airspace frequented by the faster aircraft was recognized officially in 1957 when the rule was changed to allow operations above 24,000 feet MSL only when the flight visibility was at least five miles and the cloud clearance 1,000 feet vertically and one mile horizontally.

In 1961 these minimums were imposed on all VFR flights above 14,500 feet MSL. Three years later the stricter minimums were applied to all airspace above 10,000 feet. In view of the continuing increase in numbers of high speed aircraft and their use of the strata below 10,000 feet, FAA has been obliged to examine the safety aspects of the 30-year-old VFR minimums in this segment of the airspace.

The Rowland report, latest formal analysis of VFR cloud clearance and visibility standards (FAA RD 70-48), contained a mathematical analysis of time required for avoidance in a see-and-avoid environment. The report indicated that the current vertical and horizontal cloud minimum distances may be inadequate. Recent pilot comments on this subject have expressed the view that airmen would feel safer if the same five-mile visibility and 1,000-feet vertical/one mile horizontal separation in effect in higher airspace were extended all the way to the surface. Other pilots have expressed a contrary opinion, contending that existing VFR minimums are perfectly adequate. The varying attitudes of pilots on this subject is apparently related to their level of experience and the kind of flying they do. FAA is seeking additional data which will better correlate pilot background with opinion.

Statute or Nautical?

A separate item in the notice—but one that is directly related to distance from clouds and visibility—is the standardization of measuring units. In the early days of aviation, when the only maps in common use were roadmaps, the ordinary statute mile was the only unit of measurement in aviation in this country. However, as a greater dependence on navigation charts developed, the traditional nautical mile of the ocean-going navigator (a nautical mile, about 6.076 feet, equals the length of one minute of arc on a great circle of the earth) was adopted for various aeronautical usages.

To reduce the confusion arising from the co-existence of the two measuring units, FAA proposed a complete changeover to the nautical mile/knot system over a decade ago. The idea was not acceptable to all segments of aviation, and consequently a compromise policy was adopted on October 1, 1954, whereby visibility values and narrative descriptions of airspace remained in statute miles, while nautical miles/knots were used generally for all other purposes of flight.

Nevertheless, the dual measuring standard in aviation has continued to create ambiguities and to add to the pilot's work load. For example, in a weather report, wind velocity is given in knots while the visibility is stated in statute miles. In instrument approach procedures, all measurements are based on nautical miles *except* for visibility.

Interested persons are asked to comment on the existing regulations as they currently apply to:

A. Controlled airspace.

(1) Adequacy of the vertical distance from clouds. (500 feet below and 1,000 feet above.)

(2) Adequacy of the 2,000 feet horizontal distance from clouds.

(3) Adequacy of the 3-mile visibility minimum.

(4) Adequacy of the ceiling and visibility minimums in a control zone. (1,000 feet ceiling and 3 miles visibility.)

B. Uncontrolled airspace.

(1) Adequacy of the 1-mile visibility minimum.

(2) Adequacy of the "clear to clouds" minimum when operating less than 1,200 feet above the surface.

(3) Adequacy of the cloud distances when operating more than 1,200 feet above the surface. (500 feet below, 1,000 feet above and 2,000 feet horizontally)

C. Units of measure.

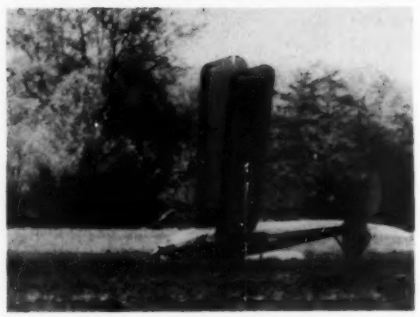
Usefulness of changing the flight visibility and reported visibility from statute miles to nautical miles.

Comments should be addressed to Docket #11350 Notice 71-24 and submitted to FAA, GC-24, 800 Independence Ave., S.W., Washington, D.C. 20591. The deadline is November 26, 1971. ■

FLYING ANTIQUES

Baron Von Richthofen's Flying Circus was not the only hazard to flight in the glory days of WW I. Just getting those early birds off the ground was an act of valor.

There is no age limit for the birdwatchers who gather on Sundays to watch fragile replicas re-enact a page of history that still is scented with nostalgia and lilacs, circa 1918.



For the spectator it is a journey backward in time as he finds all the romance, thrills—and even spills—of military aviation's infancy during WW I coming to life before his unbelieving eyes.

The Flying Circus Aerodrome of Bealeton, Va., 50 miles from the Nation's capital, is the site of an extraordinary collection of ancient "classic" aircraft which do more than stand on exhibit. Each Sunday afternoon during the summer months this antique fleet—which includes a Sopwith *Camel,* a Fokker Triplane, a French *Nieuport* and many others of romantic vintage—roar off into the sky, performing aerobatic maneuvers and engaging in simulated dog fights of the World War I epoch. On the ground, machine-gunners in sandbagged dugouts man their weapons as uniformed messengers scurry around on motorcycles; in the stands, a sea of sunburned faces watches with awe and delight.

The new show, which opened in May of this year, has attracted many thousands of spectators including many tourists who were sufficiently intrigued to make the hour-long drive from Washington, D.C. Stanford Parris, president of the Flying Circus, attributes its drawing power to the public interest in seeing what amounts to living history re-enacted before their eyes.

But Parris is quick to point out that what meets the eye at Bealeton is more than make-believe. He warns that antique aircraft are not "playtoys for the casual pilot." These planes are extremely difficult to control and can be dangerous. Only those pilots who have been thoroughly familiarized with them should ever attempt to fly them.

Parris, who was a jet pilot during the Korean War and who is now a member of the Virginia House of Delegates, has good reason to talk this way. Two of his precious aircraft have already been "lost"—at least temporarily—from accidents which took place within sight of the crowd. Fortunately, injuries were minor and the aircraft will be repaired, but the fact that the mishaps took place even with experienced pilots at the controls is a reminder that early airplanes had few of the stability characteristics and control responses to which modern pilots are accustomed.

Largest Antique Collection

The idea of an antique air circus in Virginia developed gradually among a group of flying buffs who live in the northern Virginia area, near Warrenton. The group, which includes professional men, a minister and a number of commercial pilots, noticed the success of a new antique air circus at Rhinebeck, N.Y., and they decided that there was a growing interest in the "Red Baron epoch." They agreed to pool their resources, establish a corporation, and assemble the largest collection of functioning antique aircraft in the world.

None of the aircraft they eventually collected, however, is an original. Most of the few World War I planes which still exist are in museums and would be inoperable by this time, anyway. But Parris's group were able to obtain many original parts, and to have others expressly manufactured for them. Working from old diagrams and blueprints, they constructed flyable but faithful reproductions. The *Nieuport,* for instance, was built entirely from original parts, except for its framework of hand-worked wood. But the Fokker Triplane, which is one of the three flying models of this aircraft in the world, was constructed mainly of modern materials.

Among some of the other World War I planes in the air circus are: a British *Gypsy Moth;* a Fokker *Eindecker;* an Aeronca C-3; a Curtiss JN-4, the original *Jenny;* two German Rumplers; and the British B.E.2c. Perhaps the most interesting of the ancient

A ground crew at Bealeton, Va., helps position "Little Looper," a 1911 Lincoln Beachey Pusher, as the pilot perches on the leading edge of the lower wing and prepares for immediate takeoff. The 80 hp rotary engine, with no throttle, is either "off" or "on".

planes is the 1911 Lincoln Beachey *Pusher*, the famed "Little Looper." This biplane, which is flown with the pilot sitting perched on the leading edge of the lower wing is powered by an 80 hp. rotary engine, and it is believed to be one of two flying versions of the original in the world today. Sadly enough, it was damaged in a crash following engine failure, but should be back in service next year.

The planes are based at a 200-acre aerodrome and they are housed in a wooden frame hangar which is itself a World War I replica. All week long the planes are on exhibit, but on Sundays they are flown in an impressive air show during which the pilots wear aviation togs of the era and shoot blanks from the machine guns mounted on the aircraft. Thus, the Red Baron flies again in Virginia, streaking across the sky until his Fokker is finally "shot down" by the Sopwith *Camel*.

The difficulty in flying this type of aircraft was demonstrated early in the air circus's history. Taking off for its first public performance the *Gypsy Moth* suddenly rolled over at a height of 20 feet and nosed to the ground. Luckily, neither of the two occupants suffered more than minor bruises. A few weeks later the *Pusher* ran off its flight line on takeoff and raced directly toward a group of standing planes. The pilot was unable to correct the direction, and only a last-minute full-power thrust enabled him to hurdle the tied-down airplanes and continue into the sky.

Instability in Flight

The basic problem in flying these aircraft, according to the Bealeton pilots, is their inherent instability. Designers at the time of the First World War knew comparatively little about aerodynamics. Most WW I planes have no vertical fin, and thus the rudder articulates all the time you are in flight.

The most dangerous moment in operating an antique aircraft occurs at takeoff. It may require four or five men to guide the plane down the grass runway, trotting alongside until it gains sufficient speed. Meanwhile, the tail skid digs along in the ground for about an inch or so, providing the only control the pilot has at this moment. (Hence, the derivation of the term, "tail-dragger aircraft.") None of the planes has a brake, except the *Pusher* which has a thin board positioned above the front wheel as a device for slowing it down somewhat. And two of the planes, the *Nieuport* and the *Pusher*, do not even have throttles for their rotary engines. The pilots must use full power at all times, or none at all.

Aloft there is always the danger of a sudden stall; the margin between top speed and stall may be incredibly small. The *Eindecker*, for example, which at best can manage about 85 miles per hour, stalls instantly when the flying speed is reduced below 70 miles per hour.

Landing Without Brakes

The landing procedure is complicated by the necessity of using headwinds to curtail the landing roll of non-braking aircraft.

The airfield for such aircraft must understandably be large enough to allow sufficient room for the free and unpredictable movements of landing and takeoff. And, of course, it must be a dirt or grass surface to allow the tail skid to dig into the ground.

FAA has carefully monitored the operations at the Bealeton Aerodrome, outlining safety measures for both pilots and spectators. All of the pilots who fly the antique aircraft must have at least a commercial license, and Parris estimates that all of his pilots have a minimum of 5,000 hours of air time behind them in various types of aircraft, both commercial and private. For those who are sorely tempted to "have a go" at flying antique aircraft, the veterans of the Bealeton Flying Circus offer three principal suggestions:

1. Make sure that the old plane, no matter what model, has been maintained in excellent condition by knowledgeable persons. Particular attention should be paid to the solidity of the frame. Not too many mechanics are familiar with WW I aircraft, and thus it is foolish to obtain, say, a Sopwith *Camel* and expect any local mechanic to "fix it up" for flight. The mechanic, as well as the pilot, must be well versed in the functioning of antique aircraft.

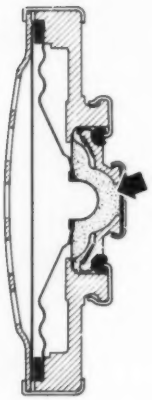
2. Do not attempt to fly the plane unless you have been carefully instructed by someone who understands the principles of antique aircraft. They are quite unforgiving in flight, and there is precious little opportunity for correcting any flying mistakes. The rotary engine of the Lincoln Beachey, for instance, is positioned directly behind the exposed pilot, and any crash or major impact could push the engine right through him.

3. Pay careful attention to the weather and field conditions. Since the plane must take off and land directly into the wind, the pilot should have a precise reading of wind direction and velocity and possible wind shifts. The condition of the ground should also be carefully studied. If the field is too wet or muddy, the plane can easily flip over.

Economy, as well as safety, dictates extreme care in the handling of antique aircraft. They are quite expensive in relation to their usefulness. Each of the planes at the Bealeton show is valued at between $15,000 and $20,000. In one recent instance, a reconstructed Sopwith *Camel* was sold for $45,000.

Maybe that is why, in the dogfights over Bealeton, it is the *Camel* that always shoots down the Fokker. ■

Takeoff is only one of the critical phases of flight in an antique. Eternal vigilance is needed in an airplane where the margin between top speed and stall is nearly non-existent.



The Captain Speaking

In good quality carbon microphones, the carbon conductor (arrow) is well supported. In some older mikes the carbon granules tend to pack or shrink, interfering with transmission fidelity.

How do you sound on your airplane radio?

Crisp? Decisive? Commanding?

Or do you come through like a tape being played at the wrong speed?

If you find yourself eliciting an annoying number of "Say again!"s, the fault is probably not inattention on the part of some air traffic controller but may lie in your own hands—in the microphone you are using. Microphones may become partially defective, without the user's knowledge, resulting in a troublesome cluttering of the airways with unintelligible transmissions.

The modern transistorized microphone is a tremendous improvement over earlier carbon or crystal mikes, but there is quite a variety in the quality of the equipment offered today. The actual price spread between the best and cheapest microphone, however, is not significant in comparison with the total investment, and consequently is not a good area for bargain hunting. A quality microphone is not only a more effective and reliable transmitting instrument but it also has a greater capacity for noise cancellation (filtering out background sounds) than less sophisticated mikes.

Occasionally transmissions from new radios will come over weak or garbled. This may be due to improper adjustment of the microphone modulation control (which should be done by the radio repair or installation station), or to the fact that the avionics system is not balanced. Like high fidelity music systems, aircraft radios require a proper balance of microphone, antennas and transmitters. For example, an incorrectly matched antenna will reflect part of the power back into the transmitter. In severe cases a five watt transmitter may be radiating only one watt or less. "Adding on" avionics system components may also upset the balance of the radio system unless it is done by a qualified technician.

A periodic check should be made of the entire antenna cable to make certain that the grounding is intact and that no cracks have developed in the cable that might admit moisture. Such failures could also interfere with transmitter performance. There are a number of reasons why transmissions may deteriorate; these require investigation and repair by qualified and knowledgeable radio technicians.

Microphones seldom fail abruptly. There is usually a progressive deterioration that can be noticed by the alert pilot who finds his communications with the air traffic service becoming less and less effective. If he suspects radio malfunction, he can simply ask the control tower how they are reading him. (A busy hour at a high density airport with IFR conditions prevailing is not the opportune moment for such a question, unless emergency circumstances justify it.)

The "stuck mike"

The bane of air traffic controllers is the "stuck mike," when the microphone key becomes stuck in the "on" position without the knowledge of the pilot, thus jamming the frequency. Unless the pilot has more than one radio, the air traffic service has no way of informing him that he is blocking out what may be a major local frequency for some 50 miles in all directions—in fact, the ground facility may have no idea which airplane is causing the trouble.

In a 30-day test during 1968, FAA found that there were approximately 285 incidents of blocked frequencies due to equipment malfunction. The period during which a frequency was not available ranged from a few minutes up to four hours. The avionics industry has since produced a simple low-cost device which would light a panel light during radio transmission, and FAA is planning to formulate a rule regarding the use of such warning devices.

Some pilots are in the habit of flying under conditions that require very little use of the radio, and they tend to disregard indications of poor reception or transmission—until some critical moment when they need help in a hurry. Nothing is more frustrating than no response to urgent calls for guidance in a crisis.

In a recent incident the young pilot of a Cessna 172 took off at dusk from Capital Airport at Springfield, Ill., knowing that his VOR was erratic and his fuel barely adequate for his intended flight to Litchfield. But it was a short hop of less than 50 miles, with a broad straight highway to guide him, so how could he possibly need a radio?

Scattered showers were reported in the area, but were not expected to move across his flight path for several hours. However, ten minutes after takeoff a strong rain spattered his windshield and he began to have trouble making out the lights of automobiles on the highway, only 2,000 feet below. The clouds directly ahead looked as dark as the inside of a cow's stomach and as he dodged his way around them, he was soon out of sight of his familiar landmark.

When he switched on his radio he realized that the VOR was really too erratic to be useful at all. With the rain and the clouds getting worse and his fuel gauges bouncing on the empty line, the moment of truth was at hand: and the truth was that he had no idea where Litchfield lay—or Springfield, for that matter.

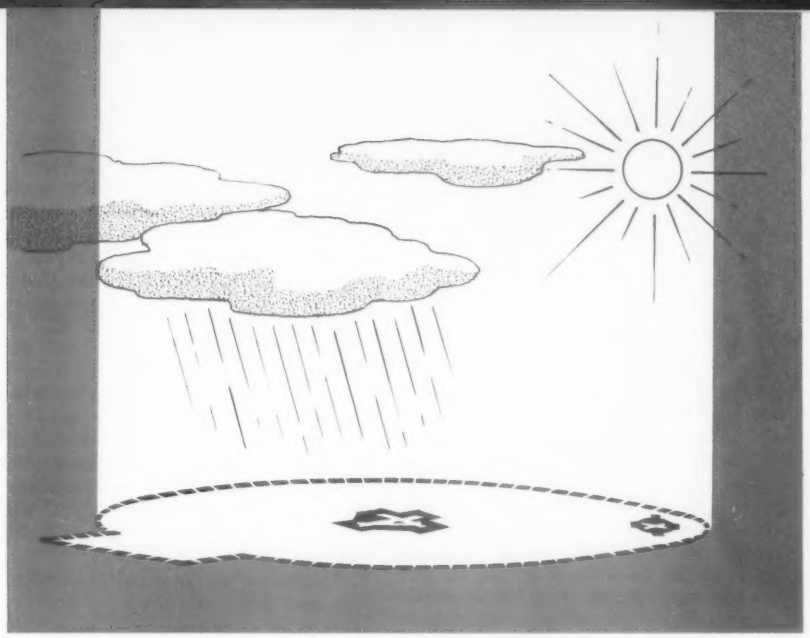
But he remembered the Springfield Tower frequency, so he fought off the panic and decided to call and ask for a Direction Finder steer back to Springfield. No problem.

Except that Springfield Tower did not answer his call. He knew he had the right frequency because he could hear the tower clearing another aircraft to land. He waited his turn and tried again, and again—no response; evidently they were not receiving him, although he could hardly be more than 20 miles away. He tried the emergency channel with no better success. The microphone in his sweating hand could have been a stick of wood, for all the use it was to him.

Thrown on his own resources and blessed with unusual luck, he was able to make an emergency landing on a patch of grassland, and he walked away from the airplane with only a few cuts and bruises to remind him to never again ignore an ailing radio.

The safety of modern flying depends very heavily on the effectiveness of your radio. Even if you only regard it as emergency equipment, make sure it will always speak when spoken to, preferably in a clear, bell-like tone.

Pilots are asked for further comments on a proposal which would provide for a "do-it-yourself" determination of VFR ceilings in control zones.



Modifying Control Zone Rules

FAA's Air Traffic Service is giving pilots another opportunity to consider its proposal to liberalize the rules affecting VFR flight operations within a control zone.

Because the Notice of Proposed Rule Making on this subject, issued on July 30, 1970, was apparently misunderstood by some concerned members of the general aviation community, a Supplemental Notice has now been issued which will seek to clarify the problems involved and elicit a broader response.

Specifically, it is proposed to amend Paragraph 91.105 (c) of the Federal Aviation Regulations as follows:

"Except as provided in Par. 91.107, no person may operate an aircraft under VFR in a control zone beneath clouds that are less than 1,000 feet above the surface."

The effect of the proposed change would be to remove the reported cloud ceiling at the primary airport as the criterion for VFR flight in a control zone, and to substitute the actual cloud condition prevailing at any other point in the control zone where VFR flight is being conducted. Pilots would make their own decision, based on their observations of cloud conditions in their immediate vicinity, instead of being dependent on observations made at the primary airport.

In order to fully understand the implications, it may be useful to review the definition of a control zone and its significance to air traffic. A control zone is a segment of controlled airspace surrounding one or more airports, extending from the surface up to the continental control area or, where the latter does not exist, to infinity.

A control zone exists only where it is indicated on sectional charts with a circular segmented line. (The use of T-shaped markers instead of simple broken lines means that Special VFR is not available within that control zone.) Normally the zone is a circle extending to a five mile radius from the primary airport—which may or may not have a control tower—with varying-shaped additions to protect IRF approach and departure paths.

The general weather restrictions for VFR flight in controlled airspace apply to control zones; i.e., below 10,000 feet, visibility must be at least three miles, cloud ceiling 1,000 feet, and aircraft must remain at least 500 feet below, 1,000 feet above, and 2,000 feet horizontally distant from clouds. Above 10,000 feet, visibility must be at least five miles, and the cloud clearance 1,000 feet vertically and one mile horizontally (see page 3 for possible changes).

As long as proper weather minimums prevail, a VFR pilot can fly through a control zone at will, at any altitude, without contacting any ground facilities. When the weather drops below prescribed minimums, however, VFR pilots may not penetrate the zone, except when given a Special VFR clearance. The purpose of the control zone is to safeguard IFR approach and departure operations under weather conditions which do not permit the safe mixture of IFR and VFR traffic.

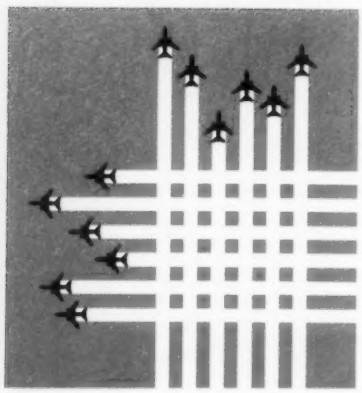
Control Zone vs. Traffic Area

(The Control Zone is sometimes confused with the *airport traffic area*, which is an identical five-mile circle around a primary airport and exists automatically wherever there is a control tower. The airport traffic area is *not* depicted as a circle on charts, extends upward *only to 3,000 feet*, and it has *no relation to weather conditions*. Aircraft may operate within the area only with authority from the tower and there are airspeed limitations. The concern here is with an orderly sequencing or separation of traffic and the issuance of traffic advisories in an area where landing and departure operations are taking place.)

The proposed rule change would not alter the 1,000-foot ceiling minimum for control zones; it would simply *shift the responsibility* for making the weather determination from a central ground facility to the individual pilot who is already responsible for observing flight visibility and cloud clearance minimums in controlled airspace. The proposal recognizes that within the five-mile radius of a control zone it is possible for an opening in the cloud ceiling to appear at one point without affecting another, or for a ceiling to change locally from broken to scattered, etc.

In the past the standard procedure has been to apply weather values existing at the primary airport to all airports within the control zone. This could result in an unnecessary restriction of operations at satellite airports when VFR ceilings prevail there but not at the primary airport. On the other hand, the existence of better than 1,000-foot ceilings at the primary airport is no assurance that VFR conditions exist everywhere else in the control zone. The proposed change is an effort to adopt a safer, more flexible attitude and spell it out in the FAR.

Comments on this Supplemental Notice of Proposed Rule Making (Docket No. 10462; Notice No. 71-22) should be sent to FAA, Rules Docket GC-24, 800 Independence Ave., S.W., Washington, D.C. 20591. The closing date for comments is November 5, 1971. ■



On June 30, 1956, the death of 128 persons in a tragic midair collision over the Grand Canyon called national attention to the need for a fail-safe system to prevent inflight collisions. Today, after 15 years of FAA/industry efforts, an apparently workable collision avoidance system (CAS) is now undergoing evaluation through computer simulations at the FAA's National Aviation Facilities Experimental Center (NAFEC) at Atlantic City, N. J. Production hardware could begin going into commercial airliners as early as next year.

In addition, avionics manufacturers are now busily working on the development of a whole spectrum of far simpler devices—so-called "mini-" or "micro-CAS's," and still simpler *pilot warning indicators* (PWI)—that will be compatible with the elaborate, expensive commercial aircraft systems and still within the price range that a general aviation pilot might afford.

Pilot warning indicators are instruments whose function is to warn a pilot of the presence of other traffic in his area, and to provide him with information that will assist him in locating that traffic. The CAS, or collision avoidance system, on the other hand, is capable of indicating to the pilot or *actually initiating* an appropriate avoidance maneuver at the proper time. Obviously the hardware needed for CAS is much more complicated (and expensive) than that required for PWI's.

FAA's efforts in this field were stepped up in 1959 with the formation of a collision prevention advisory group (COPAG) made up of representatives from Government agencies and selected civil aviation groups that had demonstrated an interest and a competence in this problem. COPAG encouraged and monitored a great variety of investigations in this field.

The road to the successful development of a CAS has been a long and difficult one requiring major electronics pioneering both in concept and in hardware. Many of the early systems, for example, were aimed at being self-sufficient; i.e., they would operate without any cooperation from other aircraft or ground stations.

The advantages of such a system were extremely appealing, since it would mean that any single aircraft, suitably equipped, could be protected without requiring such equipment on the entire civil aircraft fleet—which a cooperative system implied. However, FAA researchers concluded that a self-sufficient system, however desirable, was beyond the current state of the art—indeed, that it was many years away, and that improved aviation safety could not wait.

Accordingly, a decision was made to press on with a "co-operating" system in which aircraft within a given range would be continuously exchanging information with each other. FAA investigators were confident that the means and the cost of participating in such a system could be brought within the grasp of most aircraft owners.

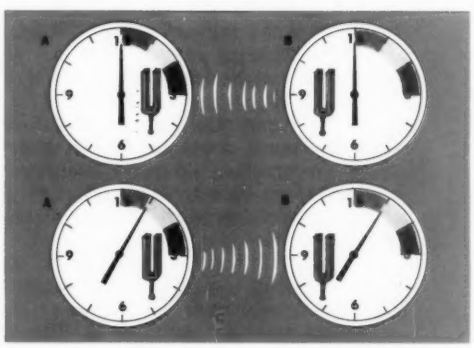
The search for an acceptable system was premised with the knowledge that it would have to be compatible with FAA's air traffic control system—granting that the ATC system was itself somewhat flexible and was bound to undergo progressive changes.

The anti-collision system would also be capable of: (1) accommodating large numbers of aircraft within communication range, (2) resolving multi-aircraft conflict situations, (3) processing hazards swiftly enough to permit avoidance, and (4) handling aircraft with varying characteristics.

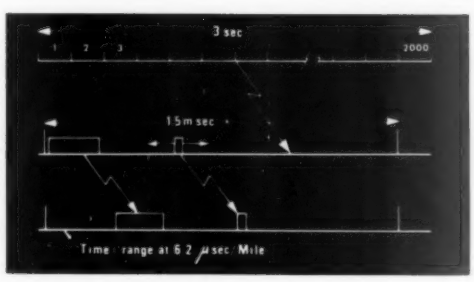
FAA research had been given directional impetus in 1956, when Dr. John S. Morrell of Bendix Radio published his mathematical confirmation of the now famous "Tau" concept which stated that adequate evaluation of a possible midair collision could be made with the exchange of data covering altitude, range (distance between aircraft), and range rate (closing speed).

Dr. Morrell subsequently concluded that a 30-second cushion of time between evaluation of the threat and the instant of potential collision would be adequate escape time for all aircraft, given reasonable reaction times, accelerations, and rates of climb. The evasive technique, which would not be severely abrupt, would be concerned solely with dis-establishing a "co-altitude." In level flight, at 10,000 feet or less, co-altitude was defined as 600 feet above or below a given aircraft; at higher altitudes it was 800 feet above or below; during climb or descent, a much broader safety margin would be required, depending upon airspeeds.

TIME on

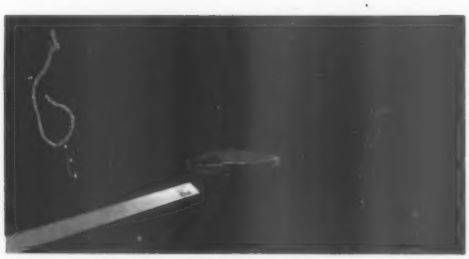


Above—a diagramatic view of the time/frequency concept. If we divide a minute into five-second intervals, we would have 12 time slots which could be assigned to specific aircraft. As the second hand moves from one slot to the next, each aircraft would broadcast a signal. Suitable equipment in other aircraft could compute the separation in miles by dividing the microseconds required to receive the transmission by 6.2—the microseconds required for light or radio signals to travel one mile. If a signal required 3.1 microseconds to arrive, range would be one-half mile.



Right—the ATA system actually uses a 3 second, 2,000 slot "epoch" rather than a 60-second cycle for CAS transmissions. Each aircraft is assigned a 1.5 millisecond slot in which to transmit range, closing rate (by means of a doppler pulse) and altitude.

on the WING



Above—relative sizes of the Tau, or protective envelope of aircraft (top) at cruise, (center) climbing to 10,000 feet, and (bottom) leaving the runway.

Time synchronization and the atomic clock form the heart of a collision avoidance system designed for the entire industry.

The problem of deriving altitude information was not difficult; it simply involved linking the panel altimeter to a radio signal. The really difficult nut to crack in the early stage of CAS development was the means of exchanging information between a large number of aircraft (which might be present over an airport) in the short space of time that would be practically available. Two-way ranging, as is used in radar or in DME, was ruled out, since it was apparent that in the absence of some form of synchronization, the result would be chaotic. If one imagines a situation in which ten or more aircraft in a terminal area are asking each other at random the question, "What is your altitude, range and range rate?" and responding to each other individually, the result might be something akin to a card game in which everyone is talking at once and nobody is listening.

During a decade of work on the collision avoidance problem FAA contracted with Bendix, Sperry Rand, the National Company, Collins Radio, and other private firms for both theoretical and hardware production. In 1963 Collins was awarded an FAA contract to study CAS techniques by simulation. Two years later Collins reported that the time/frequency system was the most promising. In that same year (1965) McDonnell Aircraft displayed flight tested CAS hardware based on this principle.

Direction of the CAS effort shifted from the Government to a Technical Working Group composed of airline engineers, avionics manufacturers, and engineers from FAA and DOD—under the leadership of the Air Transport Association representing major airlines. An early premise of the Group was that the system developed by ATA would include a family of compatible "minimum" equipments that would open the door to general aviation participation.

During 1967 the ATA-led Technical Working Group completed a technical description of airline requirements for CAS, based on the availability of frequencies designated by FAA. FAA was also asked to test (by simulation) the interaction of CAS and the air traffic control system, to study requirements for a common national CAS, and to begin efforts toward securing international agreement on such a system.

By January 1968 the Group was able to begin airline evaluation of different CAS cockpit displays, employing Link flight simulators to gather information on pilot and airframe reaction time.

Six months later the airlines engaged Martin-Marietta of Baltimore to perform tests of CAS prototype hardware built by Bendix Radio, McDonnell-Douglas and a Sierra Research-Wilcox Electric team. FAA provided test facilities at NAFEC.

In the ATA system "time frequency" provides a *one-way transfer of information* in which, one at a time, each aircraft would broadcast its own altitude, in effect saying, "Here I am at 10,000 feet, fellows. Watch out for me." Other aircraft would (by means of onboard computers) compare his altitude with their own, then compute the range from the amount of time it took for the signal to reach them, and finally, derive the range-rate from any "Doppler shift" in the frequency of the signal.

Doppler shift is an apparent change in frequency caused by a change in distance between the transmitter and receiver during the transmission. If the two are closing, the frequency rises; if they are moving apart, it goes down. This is illustrated in the change in pitch of a train whistle as the train approaches, passes, and then moves away.

While this system is indeed workable, it imposes some very stringent requirements on the hardware: specifically, very precise timekeeping and frequency control. If other aircraft are to derive their range-rates from any Doppler shifts in the transmission frequency, they must know precisely what the frequency is in order to observe any change.

Similarly, if these aircraft are computing their ranges on the basis of the time it took for the signal to reach them, they must know precisely when the transmission began. To accomplish this, they must all be keeping exactly the same time.

A key breakthrough in precision timekeeping had taken place in about 1961 when McDonnell-Douglas engineers perfected a method of resetting simple, low-cost airborne oscillators, or timing devices. This "time-frequency" makes it possible to keep relatively inaccurate timing devices on very accurate time by frequently resynchronizing them with an extremely accurate ground-based "atomic" clock.

Such clocks, which measure time with reference to the movement of atoms in response to a precise radio frequency, are accurate to within about one four-millionth of a second, and since 1967 have replaced celestial measurement as the international time standard. With this timing accuracy the path was opened to a practical co-operative collision avoidance system for aircraft.

(Part 2 of this article, appearing in the October issue of FAA AVIATION NEWS, will describe how the CAS will function for all types of aircraft.) ■

The annual or 100-hour inspection for general aviation aircraft is required by law. By contrast, the pilot's pre-flight check of his airplane is a ritual that varies not only from pilot to pilot but also from day to day, from mood to mood, and from circumstance to circumstance. Its scope is not dictated by regulation, but only by common sense—plus a desire for self-preservation. In the gap that lies between the walkaround and the annual there is opportunity for numerous small and some not-so-small malfunctions to develop—especially in the aircraft flown by the non-professional pilot who is active on weekends only.

In the time that elapses between the Sunday evening when he ties his airplane securely down (or hangars it carefully) and his next return to the airport, his beloved bird may have suffered much abuse. Some of this could be from natural causes—buffeting from high winds, hail, rain, etc. Some abuse could have come from human causes—prop or jet blasts from other planes, for example, or from sloppy handling as the plane was moved in the hangar; from someone carelessly leaning against vulnerable surfaces; from vandals seeking spare parts.

Even the most carefully watched airplane undergoes a more or less continuous deterioration from the moment it leaves the factory: from weathering, from stressful flying (especially hard landings), from weakening of internal parts and general fatigue. This aging process cannot be prevented, and many subtle symptoms of trouble-in-the-making escape the attention during the ordinary walkaround. However, it is possible to minimize the dangers of an inflight failure by means of a program of *successive inspections*.

Successive inspection in the sense that it is used here means that, in addition to the normal "once over lightly", you give particular attention to a specified area of the airplane on scheduled days. For example, a complete successive inspection schedule might cover a two-month period as follows:

First weekend:	Engine and propeller
Second weekend:	Flight controls
Third weekend:	Landing gear
Fourth weekend:	Cabin and cockpit
Fifth weekend:	Wings
Sixth weekend:	Empennage
Seventh weekend:	Skin or covering
Eighth weekend:	Radio and miscellaneous equipment

You will want to keep a written log of any significant findings. Although this log, of course, is kept separate from the official aircraft maintenance records in which only authorized personnel make entries, it may be very useful in the eventual analysis of any

Taming the FORCES of ATTRITION

A new series of articles on maintenance for the airplane owner who believes in the ounce-of-prevention maxim

mechanical problems that develop in your airplane.

Legal but nevertheless thorough pilot inspections can be made by simply removing access covers, fairings and removable cowlings. In addition to some assorted screwdrivers and wrenches your inspection tool kit may contain such items as:

Small eight-power magnifying glass
Mirror
Flashlight
Small wire brush
Dull-bladed knife
Round bristle brush
Cleaning fluids
Hydrometer
Lintless rags

What to look for: the signs of actual or incipient failure you will be looking for fall into one of two categories—*weathering* and *wear*.

Weathering means any weakening of structures from exposure to environmental moisture and temperature changes. Moisture produces oxidation, known familiarly as rust (on steel and iron parts) or corrosion (of copper, aluminum, etc.). Virtually all metals are subject to oxidation in some degree, and the aluminum skin of airframes is no exception. It is a simple matter to learn to spot rust and corrosion by the discoloration it produces. Plywood and fabric will deteriorate rapidly in a damp environment when their protective coating weakens.

Keeping the aircraft surfaces clean and washed down regularly is of two-fold importance in this connection, since this will not only retard oxidation and decay but will also prevent tell-tale signs from being obscured by dust or grime. Incidentally, even the most carefully hangared and pampered airplane is not immune to the ravages of moisture, since damp air during flight can penetrate all of the recesses of the fuselage and wings, where rust can work its malicious mischief unseen on such vital parts as control cables. This is where the flashlight and the inquiring eye are important.

In the ordinary course of flight, aircraft are also subject to rapid and sometimes extreme temperature changes, experiencing a change of as much as 50° Fahrenheit simply by climbing from the surface to cruise altitude. Certain parts, notably rubber tubing and pads, may tend to become dry, stiff or brittle after much exposure to widely varying temperatures. This loss of material vitality can usually be felt by manual inspection.

Wear refers to any type of stress-induced weakening of parts. Common kinds of wear are friction, abnormal vibration, overheating and overloading.

Friction is the wearing down of moving parts in an airplane. It can never be prevented entirely, but the process can be slowed down significantly by careful observation. Failures in the lubrication system and misalignment of parts are the two chief sources of trouble, and both can be spotted by the naked eye.

(A different type of friction occurs as a result of air passing over the airplane's surface during flight. Keeping the surfaces clean and bright keeps this air resistance down to a minimum, and may even improve the airspeed slightly. In sandy or dusty areas wind friction will have a noticeable effect on the coating of the airplane's skin.)

The most obvious indication of a lubrication problem is the presence of oil stains, which could indicate anything from a leaking seal to a ruptured line. In some cases leaking oil will remain confined to the bilge of the airframe and may only be discovered by an inflight failure—unless it is spotted during an appropriate inspection, perhaps requiring the use of a mirror.

Abrasion is a type of friction produced by foreign matter lodged between moving parts. It is almost impossible to see, but it can sometimes be felt as a gritty resistance when the controls are rotated.

Chafing is the friction that occurs when two parts not designed to be in contact rub against each other. This ailment may be sensed when the controls seem to be binding or resisting strongly when moved during an inspection. Also, the metallic finish may be worn suspiciously bright at the point of contact.

Vibration, when it exceeds the norm, produces excessive wear on parts and may induce structural fatigue. Some of the common causes of abnormal vibration are an unevenly running engine, worn engine mounting pads, propeller imbalance, and various loosened assemblies. It is sometimes quite an education for a pilot who is under the impression that his aircraft is running perfectly to take a close look at the "beast under the hood" from a vantage point on the ground.

Heat, when it exceeds the design limits, can be very destructive to an engine and its associated parts. An engine that smells strongly of burnt oil or rubber calls for a close examination. Clogging of the engine baffles or cowling vents by foreign matter (or by physical damage) can interfere with the normal cooling processes. Excessive engine idling is another source of overheating; others are wrong grade of fuel, low grade dirty oil, or a jammed carburetor heat door.

Overloading in the sense used here means stressing any part of an aircraft beyond its inherent strength. Various types of overloading include bending, twisting, tension (pulling at the ends), compression (bulging at the center), and shearing, or cutting.

Exceeding the load limitations always results in a deformed part. Although the apparent deformation may be slight, it usually indicates a serious structural weakness. Wrinkling of the metallic or fabric skin is a suspicious sign. Sighting carefully around the aircraft will often disclose some surprising bulges or misalignments. Broken or missing parts will sometimes produce a strain on adjacent airframe components that could have serious consequences. (See "For Want of a Pin," FAA AVIATION NEWS, July 1971.)

(Additional articles to follow in this series will suggest procedures for carrying out each of the eight successive inspections mentioned earlier. The basic source of information is FAA Advisory Circular 20-9, 1967, available for $1.00 from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.)

INSPECTION DO's and DON'Ts

DO clean thoroughly all items to be inspected.
DO investigate stains and spills.
DO remove all inspection plates and cowlings in the area of concern.
DO familiarize yourself with proper safetying techniques for bolts and nuts.
DON'T ever leave any part you have unsafetied before you have resafetied it.
DON'T touch the prop unless you know ignition switch is "OFF."
DON'T overlook any single item, especially if it is difficult to reach.
DON'T attempt any repairs not permitted you by FAR Part 43.3.

Famous
FLYERS

The FARMAN Brothers

French-born contemporaries of the Wrights whose dream of flight, also nourished in a bicycle shop, led to the first international airline.

Their names are all but forgotten now but in the early 1900's, Henri and Maurice Farman were as well-known in Europe as the Wright brothers were in the United States. Typical of the times, they were "cut-and-try" airplane manufacturers and designers; untypically, they survived the trial and error years, achieved a temporary pinnacle of fame, and lived to see jet flight become a commonplace matter.

Sons of a prominent English journalist who lived in France, the brothers never bothered to learn English. Like the Wrights, they began their working careers as bicycle makers and repairmen. Henri was born in 1874 and educated as an artist but speed was his early love, and he became a bicycling champion. Maurice, born in 1877, could not match his older brother's skill at cycling and took up auto racing instead. They teamed up to sell automobiles in Paris at the turn of the century.

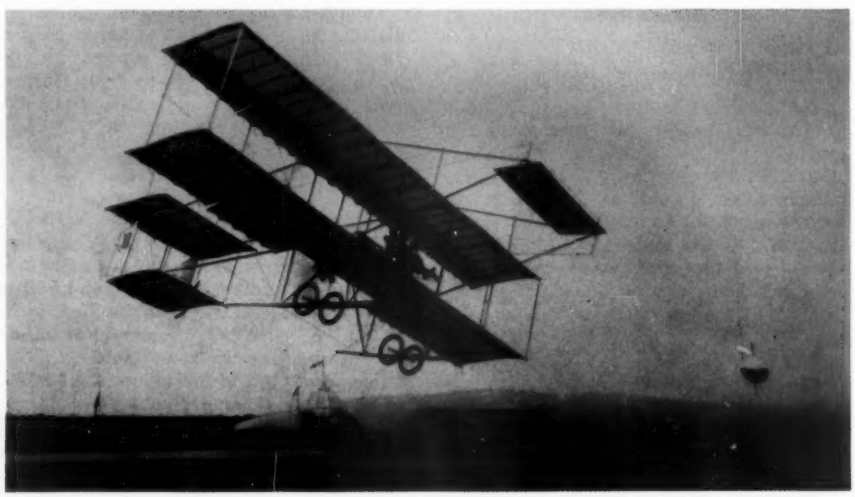
The Farmans turned to heavier-than-air flight when several early innovators received public acclaim for their experiments. One of these pioneers was Ernest Archdeacon who had obtained a copy of a Wright 1902 glider and added a motor to it. The "aeroplane du type Wright," although unsuccessful, encouraged men like Santos-Dumont, Bleriot, the Voisin brothers and the Farmans to try their luck. The great publicity that attended their early efforts in the first decade of the 1900's gave Europeans the impression that these men, and not the Wright brothers, had conquered the mystery of flight first.

In this period France was an incredibly active breeding ground for aeronautical invention. All kinds of flying contraptions were built in backyards and barns and, one by one, they got into the air. Most were feeble, fantastic, unscientific efforts at first, and successful flights were measured virtually in seconds and inches.

Henri (his given name was really Harry) Farman was first airborne in 1907 in a Voisin-designed plane which he flew a distance of 935 feet. A few days later, he won the Archdeacon Cup by flying 2,530 feet and making the first "public" turn in the air. Thus encouraged, he decided to try for the Grand Prix d'Aviation Deutsch-Archdeacon of 50,000 francs offered to the first man to fly a closed circuit of one kilometer. He modified the Voisin by incorporating some of the Wright features and the result was a huge bi-winged kite with forward elevator planes and an awkward-looking box kite tail assembly. It had two main wheels and a tail wheel and used ailerons for lateral control rather than the Wright wing-warping method.

On January 13, 1908, Henri took off from a field at Issy and flew the one kilometer course. He became a national hero overnight, and immediately set out to make other marks. He broke away from the Voisin company planes and turned out his own designs. He entered the world's first international air races held at Reims in late August 1909, where six prizes were offered, including the Gordon Bennett Trophy for the fastest speed around two laps of a six-kilometer course.

Two of Farman's planes, flown by other pilots, entered the Bennett race and placed sixth and seventh in a field of eight. Farman, recognizing that his design was not speedy, entered the competition for the Grand Prix de Champagne which carried a prize of $10,000 given for the "longest flight without alighting."



At 37 mph the early Farman planes were not considered speedy, but were reliable and roomy. In 1909 Henri won prizes for the "longest flight without alighting" (111 miles in just over 3 hours).

Eleven pilots entered this event against gravity and one by one, they dropped out. Farman did not get off until late afternoon and since darkness would probably interfere, most spectators thought he had no chance. But Henri proved otherwise. Calmly flying round and round the closed course, he passed the marks set by the Wrights and others. The sun set and he kept on flying. Flare pots were lit and motorists around the course turned their auto headlights on.

At the end of the eighteenth lap when Farman landed he had flown 111.85 miles in three hours, 4 minutes, breaking all records for distance and duration. He was the first to fly more than 100 miles and first to stay airborne more than three hours.

Farman also won the $2,000 Prix de Passagers by carrying two passengers over a closed six kilometer course. He then placed second in the Prix d'Altitude competition. A few weeks later, he made the first cross-country flight in aviation history when he flew from the plains of Chalons near Bouy to Reims, a distance of 16½ miles.

Henri's fame thus established, he toured Europe demonstrating planes and publicizing the future of aviation. He started a flying school in 1911, and in 1919 he and his brother set up one of the first courses in instrument flying.

Meanwhile, brother Maurice, the silent one, was establishing himself as a successful manager of the growing Farman auto firm which he had started while his brother was flying and building his own planes. The two then founded the Farman Aviation Works, which produced many early biplanes, mostly of the pusher variety. One of the best of this early period was designed by Maurice in 1910. Featuring curved wing tips and a combined wheel and skid landing gear, it was used by Eugene Renaux to set an altitude record that immediately brought orders from the military services of Great Britain, France and Italy. Another set an endurance record by remaining aloft 11 hours in 1911.

Harry Farman preferred to be called "Henri."

During World War I, the Farman factory turned out several hundred single and multi-engine biplane models. Best known of these was a Maurice-designed pusher which was used as a trainer with the nickname of "Longhorn." Powered by an eight cylinder water-cooled 100 hp. *Sunbeam* engine, the radiator wrapped completely around the two-man cockpit. After the war, the Farmans produced seaplanes and multi-engine land planes for passenger transport. Most notable of these was the bi-winged, twin-engine *Goliath* which had been modified from one of their wartime bombers. It had accommodations for 12 passengers.

On February 8, 1919, the Farmans founded Lignes Aeriennes Farman and began the first international passenger service with a route between London and Paris using the *Goliath*. This line later became one of those that was merged into Air France, the present French national airline.

During the 1920's and 30's, the Farmans continued to develop transport aircraft. One of those that attracted much press attention was the Farman 180, a twin-engine biplane furnished with overstuffed chairs, indirect lighting and a mahogany bar with a brass rail to hang onto in rough weather.

They experimented with pressurized cabins in the early 1930's and developed a two-stage supercharger and two-speed supercharger drive for aircraft engines. On one test flight in 1935, however, the cabin burst at 30,000 feet, killing the pilot.

A pressurized cabin was successfully incorporated in the Farman 2234, a four-engine mail carrier with which Air France made experimental flights across the South Atlantic at 25,000 feet in October 1939.

The Farman brothers, who had considered themselves Frenchmen all their lives, finally made it official by declaring French citizenship. Both lived until their eighties: Henri died in 1958; Maurice in 1964. By this time, their fame had faded and their passing attracted little notice outside of France.

Of the many inspired airmen who had flourished in France during the lively infancy of aviation, the Farman brothers were among the fortunate few who lived to see some of their wildest dreams come true.

■ TWO NEW TCA's. Terminal Control Areas (TCA's) have been added at Los Angeles and New York effective September 16, 1971, as part of a long-range program to reduce the potential for midair collisions near busy airports. Pilots flying in a TCA must have an ATC clearance, at least a private pilot certificate, and an aircraft with two-way radio, VOR receiver and transponder. TCA's in effect at Atlanta, Chicago and Washington, D.C. are presently being used by general aviation pilots without difficulty. Details can be found in the Airman's Information Manual or special TCA charts are available from National Ocean Survey, U.S. Department of Commerce or through local suppliers.

■ SKY COMING DOWN. The base of area positive control airspace (APC) has been lowered from 24,000 to 18,000 feet over the southwestern states of Arizona, New Mexico, Texas, Oklahoma, Arkansas and Louisiana in the next-to-last step in FAA's program to effect APC between 18,000 and 60,000 feet over the adjacent 48 states. Similar action is planned for the remaining southeastern states later this fall. All planes operating in APC airspace are under control of the Air Traffic Service.

■ IFR FOR MILITARY. The possibility of a midair collision under VFR conditions has been lessened as the result of an agreement between FAA and the military services which calls for most military flights to operate under IFR under direct control of FAA air traffic control facilities at all times. Except where specific activities require flying VFR, fixed wing military flights will henceforth be conducted IFR.

■ FAR PRICE INCREASE. The Price of Volume III of the FAR's has been increased by the Superintendent of Documents to $8.50 ($10.75 foreign mail) due to the amount of material that has been issued.

■ BOSTON CORRIDOR. Representatives of the aviation industry and FAA gathered in Boston recently to view simulated demonstrations of three versions of the terminal control corridor concept, which has been suggested by some segments of the aviation industry as an alternative to the terminal control area (TCA) now in use at several of the nation's busier airports.

A dual display was used; air traffic as it was actually moving was projected on one screen while a display on a plexiglass plotting board showed where the same planes would have been under the corridor system. Logan Airport was chosen for the tests because of the amount and mix of traffic. The voluminous data, along with comments from participants, are being evaluated.

PUSH BUTTON BRIEFING. Faster, more accurate flight planning is a feature of the new-style flight service station (FSS) design mockup now undergoing evaluation by air traffic specialists and pilots at FAA's National Aviation Facilities Experimental Center (NAFEC) in New Jersey. FSS specialists (right) would obtain taped or visual readouts of the latest flight planning data with the push of a button. At self-briefing consoles (left) pilots would obtain the same information, backed up by a direct line telephone for special information or clarification. A total program for FSS improvement is under study within the DOT. As part of an ongoing program to step up FSS service, FAA is recommending to Congress that a number of flight service stations undergo modernization at the earliest possible date.

Two-Sided Sectional Charts Cover Entire United States

With the issuance of the new Seattle sectional chart, the entire United States is now completely covered by the new-style charts. Changeover to the new sectionals, begun in the summer of 1967, makes it possible to fly over all the 48 adjoining states using only 37 charts, in contrast with the 87 formerly required. There is one chart for Hawaii and 15 for Alaska.

The new charts, printed on both sides of a 20" x 55" sheet of paper, are accordion-folded to a 5" x 10" size for cockpit and filing convenience, and overlap on the north and east edges for planning purposes. Scale is the same as formerly used, 1:500,000 (8 statute miles per inch). Price is 80 cents per chart.

An outstanding feature of the new charts is a more detailed portrayal of terrain features, with the highest elevation within each 30 minute square shown in large size type, denoting thousands and hundreds of feet. (Thus a figure of 3^1 indicates 3,100 feet as the highest terrain elevation within the tick-marked square. However, this does not include vertical *obstructions* which are shown by the usual symbols with MSL elevations.)

Large-scale (twice that on the rest of the chart) inserts of metropolitan areas are pictured, complete with helpful approximations of familiar landmarks in enough detail to provide recognition by the pilot. In its present form the sectional chart, plus the information contained and updated in the Airman's Information Manual, provides the VFR pilot with all of the pertinent data he needs to fly safely in the National Airspace System.

The transition to new charts was accomplished after many years of study and collaboration with the Coast and Geodetic Survey to fulfill requirements of the Department of Defense as well as FAA, thereby eliminating the need for separate civil and military series.

Anti-Collision Lights Required, May Be Red or White Flashing

All powered civil aircraft are now required to have approved anti-collision lights for night operations in accordance with a recent FAA ruling. The rule permits the use of either aviation white or aviation red flashing lights.

Previous rules permitted the use only of flashing red lights for anti-collision purposes. Owners of planes presently equipped with approved red anti-collision lights have the option of continuing the use of these lights, replacing the red lens with a white one, or replacing the entire unit with aviation white condenser-discharge lights such as Xenon.

Formerly, anti-collision lights were required only on large aircraft (those over 12,500 lbs.) and on those small aircraft certificated for night operations under airworthiness rules in effect after 1957. All planes, however, are required to have position lights —red on the left wingtip, green on the right, and white on the tail.

The rule also requires that aircraft certificated under airworthiness rules in effect after August 11, 1971, will be equipped with anti-collision lights four times brighter than previously required.

Policy Change Would Allow FAA Facilities for Private Airports

FAA is considering a major policy change which would provide for the establishment of FAA facilities and services at privately-owned airports that are open to the public. Such facilities are presently restricted to publicly-owned airports.

An ever-increasing civil air fleet, combined with the lack of airport facilities and the mounting opposition to the development of new airports, has made the privately-owned, public-use airport a vital facet of the National Airport System, according to FAA Administrator John H. Shaffer.

The policy change would require continued aeronautical use of the airports as public facilities without discrimination and would prevent the assignment of exclusive operating rights and inequality of service.

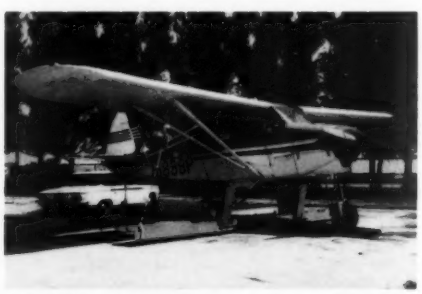
FAA May Alter Special VFR Rule

FAA has proposed a change in the regulations governing Special VFR (visual flight rules) operations by fixed-wing aircraft in airport control zones that would restrict these operations to daylight hours unless the pilot is instrument qualified and his aircraft equipped for instrument flight.

Special VFR operations include takeoffs and landings conducted under *less* than basic VFR weather minimums for control zones (at least three-mile visibility and 1,000-foot ceiling). Minimums for Special VFR are one-mile visibility and clear of clouds.

Under present rules Special VFR is permitted in all control zones except at 33 major hubs where it was discontinued because of heavy traffic. FAA noted in the proposal that most Special VFR accidents have happened at night with non-instrument rated pilots.

Comments on the proposal (#71-23, Docket #11348) should be sent to FAA, GC-24, 800 Independence Ave. SW, Washington, D.C. 20591 by November 26, 1971.



STORM SAVER. An airport operator in the Florida Keys, site of many a violent tropical storm, has devised a system for protecting light aircraft on the ground during the storm season. He mounts them on a turntable so that they automatically weather vane into the wind, thus minimizing wind damage.

• Clear for Takeoff, IFR

We have IFR standard takeoff minimums of one mile visibility for a plane with two engines or less; and one-half mile for more than two engines, which apply only to operations "for hire." But if I am flying for hire in a twin and call for takeoff when the visibility is only one-half mile the tower will clear me without questioning the legality of the operation.

A commercial pilot, concerned mostly with making money, might be tempted to take off illegally: he is not questioned as to whether he is flying for hire until there is less than one-quarter mile visibility. What good are takeoff minimums on approach plates if you have such a big gap in safety to play with before takeoff clearance is withheld, and what good are rules if they are not enforced?

George H. Myers
Sparks, Nevada

The primary responsibility of the air traffic controller is the safe, orderly, expeditious flow of air traffic. This function is carried out through the use of clearances and advisories. However, the receipt of a clearance is never *an authorization for a pilot to deviate from any applicable rule or regulation, nor to conduct unsafe operation of his aircraft.*

Data prescribing takeoff minima applying to each operation may not be known in the tower (purpose of flight, type of airman's certificate held, etc.). Controllers are directed not *to issue takeoff clearance to a known air carrier or commercial aircraft operating for hire when visibility is less than one-fourth mile, since this is* the absolute minimum *for takeoff for any operation under FAR Parts 121, 123, 129, or 135.*

It remains the pilot's responsibility to operate within all *rules which apply to his particular operation, and we find that most pilots do so voluntarily.*

Incidentally, under a proposed new FAA rule (NPRM 71-1) the IFR minimum takeoff visibilities would apply to all operations, including private aircraft.

• Right of Way

All the flying hours in the world, regardless of ratings held, are gone for naught during moments of over-confidence or when we demand the right-of-way. In a recent accident in the Chicago area a Cessna on a straight-in final was involved with a *Cherokee* turning base at a non-controlled airport.

I personally would like to see non-controlled airports put their UNICOM transceivers in a glassed-in enclosure where a qualified pilot on the ground can monitor the traffic pattern. I also wish some bright-eyed electronics designer would come up with a low-powered frequency where transmissions are only audible for 15 miles. The present UNICOM frequency of 122.8 MHz (even with the use of "good operating practices") is overly crowded in many metropolitan areas.

Raymond L. Davies, M/Sgt. USAF (ret)
Maywood, Ill.

An Advanced Notice of Proposed Rule Making to standardize traffic patterns at uncontrolled airports has been published by FAA (see FAA AVIATION NEWS, August 1971). Other possible safety improvements, similar to those you suggest, are under consideration.

• IFR School for Lost VFR Pilots

Our compliments on a consistently fine magazine! We were especially interested in the article "Bring Them Back Alive" in February 1971 FAA AVIATION NEWS. Controllers do a really fantastic job.

I do question the wisdom of only a 30-day suspension for the Cessna 3315R pilot. Rather than imposing a penalty, why not adopt a policy that goes like this: If a VFR pilot gets caught in IFR weather and then lands safely, require 30 hours of IFR instruction within the next 90 days (or finish his IFR rating, whichever comes first), or forfeit his license. After such training he would be a far safer pilot—and so would the rest of us.

Dr. S. Omar Overly
Sykesville, Md.

• Pass Along the Good Word

I would like to congratulate FAA and the DOT for a job well done. The "Private Pilot Written Examination Guide," AC 61-32, is just excellent! This is the type of questions that we should have on the FAA written examinations. I wish they would do the same for the "Instrument Flying Handbook," AC 61-27A. Please pass along to your readers that this book (AC 61-32) is available.

Keep up the good work. I enjoy reading FAA AVIATION NEWS very much.

W. W. Jones, D.D.S.
Vinton, Virginia

It is helpful to those who prepare the guides to have the reaction of those who use them. A revision of the "Instrument Flying Handbook," AC 61-27B, is presently being printed and will be available shortly.

• I Am Curious: Catalog Numbers

I am curious as to why the FAA AVIATION NEWS does not give catalog numbers when they refer the reader to publications sold by the Superintendent of Documents.

I am sure you are aware of how long it takes to receive publicatinos from GPO even when the catalog number is given. I hate to think how much longer it would take if the catalog number were not given.

Michael K. Cassidy
Silver Spring, Md.

The catalog number is not immediately available for new publications. Whenever possible we try to include this information.

• Controller Candidates

What effect will the changes in FAA domestic regions (FAA AVIATION NEWS, April 1971) have on my Personal Qualifications Statement where I designated certain areas to which I preferred to be assigned?

Having passed all the necessary Civil Service tests, I've been waiting a long time to hear from FAA about an appointment as an Air Traffic Control Specialist. Has the great need for controllers suddenly been filled?

Sidney P. DeBoer
Clear Lake, Iowa

FAA Aviation News welcomes comments from the aviation community. We will reserve this page for an exchange of views. No anonymous letters will be used, but names will be withheld on request.

There is a geographical difference between the Civil Service Examining Jurisdiction and the FAA region. The areas of interest which you designated on your Personal Qualifications Statement were Civil Service Examining Jurisdictions and your application for job consideration in these areas is still valid.

FAA has had over 25,000 applications for controller positions. Hiring is continuing. The Personnel Officer in your nearest FAA field office should be able to give you news of your status.

• Wholly British

The article "The Warbird Flyer" in the June 1971 FAA AVIATION NEWS discusses the AT-6 *Texan* but fails to explain that the cockpit photo is not the typical AT-6 configuration but rather the Canadian *Harvard* version, which was tailored for the RCAF and the RAF neophyte trainee. Various British cockpit layouts of W.W. II vintage utilized the control stick with the "doughnut" on top. The story goes that if a pilot had his hand shot off in combat he could still control the aircraft by thrusting the stump of the arm through the doughnut, and he could —theoretically—return home if sufficient blood supply remained.

There were other differences between the Harvard and the U.S. versons of the T-6. Incidentally, forty plus T-6's and *Harvards,* with a few Vultee *Vibrators,* were used as basic airframes to simulate Japanese aircraft for the movie "Tora, Tora, Tora." I had the pleasure of flying in the Pearl Harbor sequences of that movie in 1969.

As a military pilot (Navy) who began my flying career in the SNJ (Navy version of the T-6) and later instructed in it, I fully support your admonition to the non-military pilot to "get professional help" before attempting to tame the *Texan.* In years to come you can extend this advice to the T-28 *Trojan* aspirants. Our novice will then be dealing with a 1,000+ hp version and torque like he has probably never encountered before.

Cdr. J. B. McDaniel, USN
Arlington, Va.

You are right about the cockpit in the photo, since the particular aircraft shown is the Canadian version. Thank you for the explanation—knew there was some reason for the hole in the "doughnut."

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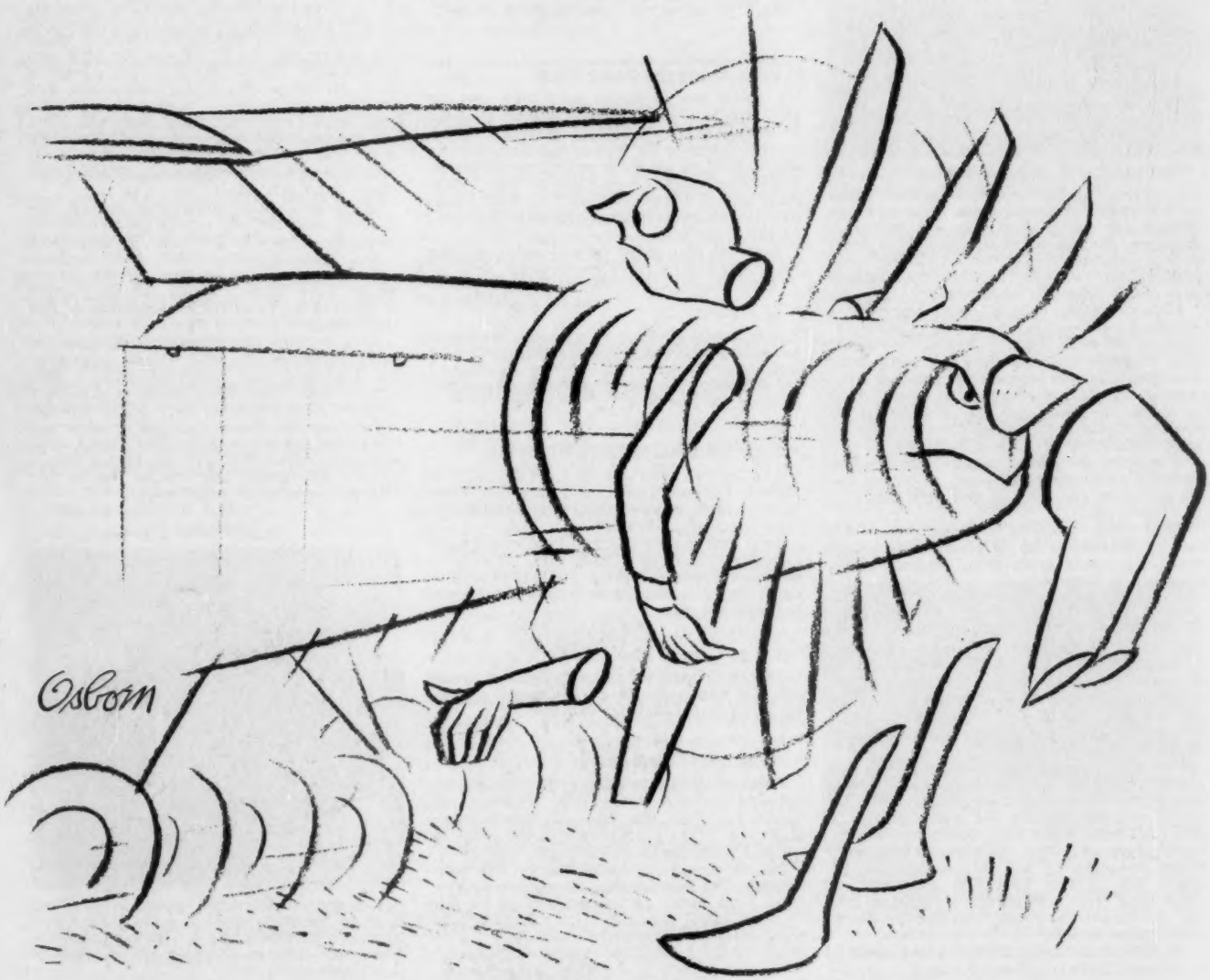

Could cook your goose

Suggested by Robert W. Brown, Jr.
ASB, Aeronautical Center